IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

APPEAL BRIEF FOR THE APPELLANT

Ex parte Paul KALAPATHY, et al.

PIPELINED SEARCHES WITH A CACHE TABLE

Serial No. 09/985,763
Appeal No.: Not yet assigned
Group Art Unit: 2616

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Appeal Brief

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Appellant:	Confirmation No.: 4336
Paul KALAPATHY, et al.	Appeal No.: Not yet assigned
Serial Number: 09/985,763	Group Art Unit: 2616
Filed: November 6, 2001	Examiner: Hong Sol CHO

For: PIPELINED SEARCHES WITH A CACHE TABLE

APPEAL BRIEF

December 19, 2006

I. INTRODUCTION

This is an appeal from the final rejection set forth in an Official Action dated July 19, 2006, ("the Office Action") finally rejecting claims 1-25, all of the claims pending in this application, as being unpatentable. A response to the Office Action was timely filed on August 9, 2006, ("the Response"). An Advisory Action was mailed on August 23, 2006, maintaining the above rejections and providing a brief response to some of the arguments presented in the response. A Notice of Appeal and Pre-Appeal Brief Request for Review were timely filed on October 19, 2006. A Notice of Panel Decision was mailed November 13, 2006, bearing the signature and initials of only two examiners, and permitting the appeal to continue. This Appeal Brief is being timely filed within two months of the filing of the Notice of Appeal. Because the rejections are in error, it is respectfully requested that the rejections be reversed.

II. REAL PARTY IN INTEREST

The real party in interest in this application is Broadcom Corporation, of Irvine, California, by virtue of an assignment by the inventors. The assignment was recorded at Reel 012299, Frame 0022, on November 6, 2001.

III. STATEMENT OF RELATED APPEALS AND INTERFERENCES

There are no known related applications, patents, judicial proceedings, appeals, and/or interferences that are related to, will directly effect, be directly effected by, or have a bearing on the Board's decision in this appeal.

IV. STATUS OF CLAIMS

Each of claims 1-25, all of the claims pending in the present application, were rejected and their respective rejections are the subject of this appeal. Claims 1-2, 4, 6-8, 10, 12-13, 15-17, 19, and 21 were each rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,453,358 of Michels et al. ("Michels"). Claims 3, 5, 9, 11, 14, 18, and 20 were each rejected under 35 U.S.C. 103(a) as being unpatentable over Michels alone. Claims 22-25 were each rejected under 35 U.S.C. 103(a) as being unpatentable over Michels in view of allegedly admitted prior art ("AAPA").

V. STATUS OF AMENDMENTS

Claims 1-25 stand as they were previously presented prior to the Office Action. No amendments have been submitted or entered since that time. Thus, claims 1-25 are pending and their respective rejections are appealed.

VI. SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1 recites a table search device. *See, for example*, paragraph [0006], and Figures 3-4. The table search device of claim 1 includes a table having a plurality of entries. *See, for example*, "8k table" in Figure 3 and "16k table" in Figure 4" and paragraphs [0015] and [0038]. The table search device of claim 1 also includes a cache having a subset of entries of said plurality of entries of said table. *See, for example*, "cache" in Figures 3 and 4 and paragraphs [0015] and [0038]. The table search device of claim 1 further includes a search engine configured to search said cache in a first number of search cycles and then search said table in a second number of search cycles based on search results of said cache, said search engine connected to said table and said cache. *See, for example*, Figure 5, items 510 and 520 and paragraph [0052].

Claim 7 recites a table search system. *See, for example*, paragraph [0006], and Figures 3-4. The table search system of claim 7 includes a table means for storing a plurality of entries. *See, for example*, "8k table" in Figure 3 and "16k table" in Figure 4" and paragraphs [0015] and [0038]. The table search system of claim 7 also includes a cache means for storing a subset of entries of said plurality of entries of said table means. *See, for example*, "cache" in Figures 3 and 4 and paragraphs [0015] and [0038]. The table search system of claim 7 further includes a search engine means for initially searching said cache means in a first number of search cycles and then searching said table means in a second number of search cycles based on search results of said cache means. *See, for example*, Figure 5, items 510 and 520 and paragraph [0052].

Claim 8 recites, among other things, a search stage zero segment means for

searching said cache means in said first number of search cycles, said search stage zero segment means being connected to said cache means. *See, for example*, Figure 3, box labeled "search stage zero" and paragraphs [0038] to [0040]. Claim 8 also recites, among other things, a search stage one segment means for searching said table means in said second number of search cycles based on search results of said cache means, said search stage one segment means being connected to said table and said search stage zero means. *See, for example*, Figure 3, box labeled "search stage one" and paragraph [0038].

Claim 13 recites a method for performing a table lookup. *See, for example*, paragraph [0011], and Figure 5. The method of claim 13 includes creating a table having a plurality of entries in a search device. *See, for example*, "8k table" in Figure 3 and "16k table" in Figure 4" and paragraphs [0015] and [0038]. The method of claim 13 also includes creating a cache, in the search device, having a subset of entries of said plurality of entries of said table. *See, for example*, "cache" in Figures 3 and 4 and paragraphs [0015] and [0038]. The method of claim 13 further includes searching, by a search engine in the search device, said cache in a first number of search cycles. *See, for example*, Figure 5, item 510 and paragraph [0052]. The method of claim 13 additionally includes searching, by the search engine, said table in a second number of search cycles based on search results of said cache. *See, for example*, Figure 5, item 520 and paragraph [0052].

Claim 16 recites a network switch. *See, for example*, paragraph [0006], and Figures 3-4. The network switch of claim 16 includes an ARL table having a plurality of

entries. *See, for example*, "8k table" in Figure 3 and "16k table" in Figure 4" and paragraphs [0015], [0038], [0053], and [0054]. The network switch of claim 16 also includes an ARL cache having a subset of entries of said plurality of entries of said ARL table. *See, for example*, "cache" in Figures 3 and 4 and paragraphs [0015], [0038], and [0053]. The network switch of claim 16 further includes a search engine configured to first search said ARL cache in a first number of search cycles and then search said ARL table in a second number of search cycles based on search results of said ARL cache, said search engine connected to said ARL table and said ARL cache. *See, for example*, Figure 5, items 510 and 520 and paragraphs [0052] and [0054]. The search device of claim 16 includes the search engine and the ARL table. *See, for example*, Figures 3 and 4 and paragraph [0053].

Claim 23 recites, among other things a single substrate means. *See, for example*, paragraph [0055].

VII. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are as follows: the rejection of claims 1-2, 4, 6-8, 10, 12-13, 15-17, 19, and 21 under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,453,358 of Michels et al. ("Michels"); the rejection of claims 3, 5, 9, 11, 14, 18, and 20 under 35 U.S.C. 103(a) as being unpatentable over Michels alone; and the rejection of claims 22-25 under 35 U.S.C. 103(a) as being unpatentable over Michels in view of allegedly admitted prior art ("AAPA").

VIII. ARGUMENT

Appellants respectfully submit that each of the pending claims, 1-25, recites subject matter that is neither disclosed nor suggested by the cited art. Each of the claims is being argued separately, and thus each of the claims stands or falls alone.

A. The rejection of claims 1-2, 4, 6-8, 10, 12-13, 15-17, 19, and 21 under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,453,358 of Michels et al. ("Michels") is in error and should be reversed.

Michels is directed to a network switching device with concurrent key lookups. The switching device includes multiple binary search engines coupled in series including one or more precursor search engines, and a final stage binary search engine.

Michels describes that it uses pipelining, which is defined as connecting search engines in series. Michels asserts that by pipelining search engines, increased throughput can be achieved. Michels posits that it is another aspect of Michels' invention to permit each of the search engines to perform concurrent source and destination searches of the lookup table.

As explained at column 4, lines 40-52, figure 3 of Michels shows a switching device 50 having a port 52 and port intercommunication logic 54, Port 52 includes a media interface 56, a primary memory 58, and a search engine 60. The search engine 60 includes temporary packet storage 62, packet analysis and key extraction logic 64, two internal binary search engines 66, 68, a first stage memory 70, and forwarding decision logic 72. There are multiple ports (not shown) in switching device 50. One or more ports are located on channel cards (not shown) mounted in a chassis. The number

of ports and how the ports and port intercommunication logic 54 are mounted within a chassis are based on the particular application and are not important to the invention.

It is axiomatic that anticipation of a claim under 35 U.S.C. § 102 can be found only if the prior art reference discloses every element of the claim. *See In re King*, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986) and *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984). As set forth in detail below, with regard to each claim involved in this appeal, it is respectfully submitted that anticipation cannot properly be found, because the cited art fails to disclose every element of each claim. Thus, it is respectfully requested that each of the rejections be reversed.

1. The rejection of claim 1 is in error and should be reversed.

Claim 1, upon which claims 2-6 depend, is directed to a table search device. The device includes a table having a plurality of entries. The device also includes a cache having a subset of entries of the plurality of entries of the table. The device further includes a search engine configured to first search the cache in a first number of search cycles and then search the table in a second number of search cycles based on search results of the cache. The search engine is connected to the table and the cache.

It is respectfully submitted that Michels fails to disclose or suggest all of the elements of claim 1.

Claim 1 recites, in part, "A table search device comprising: a table having a plurality of entries." Michels does not disclose or suggest at least these features of the present invention.

The Office Action cited Michels Figure 3 as showing these recitations. Michaels, however, clearly shows Primary Memory 58 (which the Office Action identified as corresponding to the claimed table) as separate and outside of search engine 60 (which the Office Action identified as corresponding to the claimed search device). Thus, Michaels does not disclose or suggest what claim 1 recites.

Indeed, Michaels clearly differentiates between its Stage 1 Memory 70 (which the Office Action identified as corresponding to the claimed cache) which is shown and described as being part of the search engine, and the Primary Memory 58 which is shown and described as separate.

The Office Action responded to the above distinction (as explained in a response filed June 29, 2006) by stating, at page 6, that Appellants should "refer to the rejection of claims 1, 7, 13, and 16." Appellants respectfully submit that the rejection of claims 1, 7, 13, and 16 is not responsive to Appellants' argument, because the rejection of claims 1, 7, 13, and 16 does not address the clear distinction in Michels between the search engine (shown by box 60 in Figure 3) and the primary memory (shown by box 58 in Figure 3). Like the media interface (shown by box 56 in Figure 3), the network cable (shown by arrow 74 in Figure 3), and the port intercommunication logic (shown as box 54 in Figure 3), the primary memory 58 is clearly not part of box 60, i.e. the search engine of Michels. The Office Action's comment to refer to the rejection, thus, does not address Applicant's arguments presented in the response filed June 29, 2006.

MPEP 707.07(f) sets forth the Examiner's obligation to answer all material traversed. Specifically MPEP 707.07(f) states that "the examiner should, if he or she repeats the rejection, take note of the applicant's argument and **answer the substance**

of it." (Emphasis added.) The Office Action took note of Appellants' argument, but failed to answer the substance of it. It is essential that the Office Action address each of the arguments presented by Appellants, so that meaningful appellate review is possible. The Office Action, however, did not address Appellants' arguments. Accordingly, a response to the arguments if any is provided in the Examiner's Answer, may constitute a new ground of rejection and may provide a basis for Appellants to reopen prosecution.

Accordingly, it is respectfully submitted that Michels fails to disclose all of the elements of any of the presently pending claims, and that the Office Action does not provide a substantial basis for refusing to grant a patent, and thus should be reversed for each of those reasons.

The Advisory Action did not remedy the deficiencies of the Office Action with regard to responding to the distinctions presented above. The Advisory Action, on the continuation sheet, simply asserted that "Michels discloses a search device including two binary search engines (a search engine), stage 1 memory and primary memory." However, as can be clearly seen in Figure 3, the Advisory Action's assertion is factually incorrect. That is not what Michels discloses. Michels discloses a search device (60) including two binary search engines (66 and 68) and a first stage memory (70). Michels' search device (60) additionally includes key extraction logic 64 and forwarding decision logic 72, but does not include primary memory 58. Accordingly, there is no rational basis upon which the rejection can be upheld. Furthermore, the Advisory Action's assertion does not address the arguments provided above: it simply indicates disagreement.

Accordingly, because Michels does not disclose or suggest all of the elements of claim 1, it is respectfully requested that the rejection of claim 1 be reversed.

2. The rejection of claim 2 is in error and should be reversed.

Claim 2 depends from claim 1 and further recites a search stage zero segment configured to search the cache in the first number of search cycles, the search stage zero segment connected to the cache. Claim 2 also further recites a search stage one segment configured to search the table in a second number of search cycles based on search results of the cache, the search stage one segment connected to the search stage zero segment and the table.

Appellants respectfully submit that the arguments regarding claim 1 also apply to claim 2. Accordingly, it is respectfully submitted that claim 2 recites subject matter that is neither disclosed nor suggested by Michels. Thus, it is respectfully requested that the rejection of claim 2 be reversed.

3. The rejection of claim 4 is in error and should be reversed.

Claim 4 depends from claim 1 and further recites that the first number of search cycles is equal to the second number of search cycles.

Appellants respectfully submit that the arguments regarding claim 1 also apply to claim 4. Accordingly, it is respectfully submitted that claim 4 recites subject matter that is neither disclosed nor suggested by Michels. Thus, it is respectfully requested that the rejection of claim 4 be reversed.

4. The rejection of claim 6 is in error and should be reversed.

Claim 6 depends from claim 2 (which, in turn, depends from claim 1) and further

recites that the first number of search cycles is equal to the second number of search cycles.

Appellants respectfully submit that the arguments regarding claims 1 and 2 also apply to claim 6. Accordingly, it is respectfully submitted that claim 6 recites subject matter that is neither disclosed nor suggested by Michels. Thus, it is respectfully requested that the rejection of claim 6 be reversed.

5. The rejection of claim 7 is in error and should be reversed.

Claim 7, upon which claims 8-12 depend, is directed to a table search system. The table search system includes a table means for storing a plurality of entries. The table search system also includes a cache for storing a subset of entries of the plurality of entries of the table means. The table search system further includes a search engine means for initially search the cache means in a first number of search cycles and then searching the table means in a second number of search cycles based on search results of the cache means.

It is respectfully submitted that Michels fails to disclose or suggest all of the elements of claim 7.

Claim 7 recites, in part, "A table search system comprising: a table means for storing a plurality of entries." Michels does not disclose or suggest at least these features of the present invention.

The Office Action cited Michels Figure 3 as showing these recitations. Michaels, however, clearly shows Primary Memory 58 (which the Office Action identified as corresponding to the claimed table) as separate and outside of search engine 60 (which

the Office Action identified as corresponding to the claimed search device). Thus, Michaels does not disclose or suggest what claim 7 recites.

Indeed, Michaels clearly differentiates between its Stage 1 Memory 70 (which the Office Action identified as corresponding to the claimed cache) which is shown and described as being part of the search engine, and the Primary Memory 58 which is shown and described as separate.

The Office Action responded to the above distinction (as explained in a response filed June 29, 2006) by stating, at page 6, that Appellants should "refer to the rejection of claims 1, 7, 13, and 16." Appellants respectfully submit that the rejection of claims 1, 7, 13, and 16 is not responsive to Appellants' argument, because the rejection of claims 1, 7, 13, and 16 does not address the clear distinction in Michels between the search engine (shown by box 60 in Figure 3) and the primary memory (shown by box 58 in Figure 3). Like the media interface (shown by box 56 in Figure 3), the network cable (shown by arrow 74 in Figure 3), and the port intercommunication logic (shown as box 54 in Figure 3), the primary memory 58 is clearly not part of box 60, i.e. the search engine of Michels. The Office Action's comment to refer to the rejection, thus, does not address Applicant's arguments presented in the response filed June 29, 2006.

MPEP 707.07(f) sets forth the Examiner's obligation to answer all material traversed. Specifically MPEP 707.07(f) states that "the examiner should, if he or she repeats the rejection, take note of the applicant's argument and **answer the substance of it.**" (Emphasis added.) The Office Action took note of Appellants' argument, but failed to answer the substance of it. It is essential that the Office Action address each of the arguments presented by Appellants, so that meaningful appellate review is possible. The

Office Action, however, did not address Appellants' arguments. Accordingly, a response to the arguments if any is provided in the Examiner's Answer, may constitute a new ground of rejection and may provide a basis for Appellants to reopen prosecution.

Accordingly, it is respectfully submitted that Michels fails to disclose all of the elements of any of the presently pending claims, and that the Office Action does not provide a substantial basis for refusing to grant a patent, and thus should be reversed for each of those reasons.

The Advisory Action did not remedy the deficiencies of the Office Action with regard to responding to the distinctions presented above. The Advisory Action, on the continuation sheet, simply asserted that "Michels discloses a search device including two binary search engines (a search engine), stage 1 memory and primary memory." However, as can be clearly seen in Figure 3, the Advisory Action's assertion is factually incorrect. That is not what Michels discloses. Michels discloses a search device (60) including two binary search engines (66 and 68) and a first stage memory (70). Michels' search device (60) additionally includes key extraction logic 64 and forwarding decision logic 72, but does not include primary memory 58. Accordingly, there is no rational basis upon which the rejection can be upheld. Furthermore, the Advisory Action's assertion does not address the arguments provided above: it simply indicates disagreement.

Accordingly, because Michels does not disclose or suggest all of the elements of claim 7, it is respectfully requested that the rejection of claim 7 be reversed.

6. The rejection of claim 8 is in error and should be reversed.

Claim 8 depends from claim 7 and further recites a search stage zero segment

means for searching the cache means in the first number of search cycles, the search stage zero segment means being connected to the cache means. Claim 8 also further recites a search stage one segment configured to search the table in a second number of search cycles based on search results of the cache, the search stage one segment connected to the search stage zero segment and the table.

Appellants respectfully submit that the arguments regarding claim 7 also apply to claim 8. Accordingly, it is respectfully submitted that claim 8 recites subject matter that is neither disclosed nor suggested by Michels. Thus, it is respectfully requested that the rejection of claim 8 be reversed.

7. The rejection of claim 10 is in error and should be reversed.

Claim 10 depends from claim 7 and further recites that the first number of search cycles is equal to the second number of search cycles.

Appellants respectfully submit that the arguments regarding claim 7 also apply to claim 10. Accordingly, it is respectfully submitted that claim 10 recites subject matter that is neither disclosed nor suggested by Michels. Thus, it is respectfully requested that the rejection of claim 10 be reversed.

8. The rejection of claim 12 is in error and should be reversed.

Claim 12 depends from claim 8 (which, in turn, depends from claim 7) and further recites the first number of search cycles is equal to the second number of search cycles.

Appellants respectfully submit that the arguments regarding claims 7 and 8 also apply to claim 12. Accordingly, it is respectfully submitted that claim 12 recites subject

matter that is neither disclosed nor suggested by Michels. Thus, it is respectfully requested that the rejection of claim 12 be reversed.

9. The rejection of claim 13 is in error and should be reversed.

Claim 13, upon which claims 14-15 depend, is directed to method for performing a table lookup. The method includes creating a table having a plurality of entries in a search device. The method also includes creating a cache, in the search device, having a subset of entries of said plurality of entries of said table. The method additionally includes searching, by a search engine in the search device, said cache in a first number of search cycles. The method further includes searching, by the search engine, said table in a second number of search cycles based on search results of said cache.

It is respectfully submitted that Michels fails to disclose or suggest all of the elements of claim 13.

Claim 13 recites, in part, "creating a table having a plurality of entries in a search device." Michels does not disclose or suggest at least these features of the present invention.

The Office Action cited Michels Figure 3 as showing these recitations. Michaels, however, clearly shows Primary Memory 58 (which the Office Action identified as corresponding to the claimed table) as separate and outside of search engine 60 (which the Office Action identified as corresponding to the claimed search device). Thus, Michaels does not disclose or suggest what claim 13 recites.

Indeed, Michels clearly differentiates between its Stage 1 Memory 70 (which the Office Action identified as corresponding to the claimed cache) which is shown and

described as being part of the search engine, and the Primary Memory 58 which is shown and described as separate.

The Office Action responded to the above distinction (as explained in a response filed June 29, 2006) by stating, at page 6, that Appellants should "refer to the rejection of claims 1, 7, 13, and 16." Appellants respectfully submit that the rejection of claims 1, 7, 13, and 16 is not responsive to Appellants' argument, because the rejection of claims 1, 7, 13, and 16 does not address the clear distinction in Michels between the search engine (shown by box 60 in Figure 3) and the primary memory (shown by box 58 in Figure 3). Like the media interface (shown by box 56 in Figure 3), the network cable (shown by arrow 74 in Figure 3), and the port intercommunication logic (shown as box 54 in Figure 3), the primary memory 58 is clearly not part of box 60, i.e. the search engine of Michels. The Office Action's comment to refer to the rejection, thus, does not address Applicant's arguments presented in the response filed June 29, 2006.

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Accordingly, it is respectfully submitted that Michels fails to disclose all of the

elements of any of the presently pending claims, and that the Office Action does not provide a substantial basis for refusing to grant a patent, and thus should be reversed for each of those reasons.

The Advisory Action did not remedy the deficiencies of the Office Action with regard to responding to the distinctions presented above. The Advisory Action, on the continuation sheet, simply asserted that "Michels discloses a search device including two binary search engines (a search engine), stage 1 memory and primary memory." However, as can be clearly seen in Figure 3, the Advisory Action's assertion is factually incorrect. That is not what Michels discloses. Michels discloses a search device (60) including two binary search engines (66 and 68) and a first stage memory (70). Michels' search device (60) additionally includes key extraction logic 64 and forwarding decision logic 72, but does not include primary memory 58. Accordingly, there is no rational basis upon which the rejection can be upheld. Furthermore, the Advisory Action's assertion does not address the arguments provided above: it simply indicates disagreement.

Accordingly, because Michels does not disclose or suggest all of the elements of claim 13, it is respectfully requested that the rejection of claim 13 be reversed.

10. The rejection of claim 15 is in error and should be reversed.

Claim 15 depends from claim 13 and further recites the first number of search cycles used to search the cache is equal to the second number of search cycles used to search the table.

Appellants respectfully submit that the arguments regarding claim 13 also apply to claim 15. Accordingly, it is respectfully submitted that claim 15 recites subject matter that

is neither disclosed nor suggested by Michels. Thus, it is respectfully requested that the rejection of claim 15 be reversed.

11. The rejection of claim 16 is in error and should be reversed.

Claim 16, upon which claims 17-21 depend, is directed to a network switch. The network switch includes an ARL table having a plurality of entries. The network switch also includes an ARL cache having a subset of entries of the plurality of entries of the ARL table. The network switch further includes a search engine configured to first search the ARL cache in a first number of search cycles and then search the ARL table in a second number of search cycles based on search results of the ARL cache. The search engine is connected to the ARL table and the ARL cache. A search device includes the search engine and the ARL table.

It is respectfully submitted that Michels fails to disclose or suggest all of the elements of claim 16.

Claim 16 recites, in part, "wherein a search device comprises the search engine and the ARL table." Michels does not disclose or suggest at least these features of the present invention.

The Office Action cited Michels Figure 3 as showing these recitations. Michaels, however, clearly shows Primary Memory 58 (which the Office Action identified as corresponding to the claimed table) as separate and outside of search engine 60 (which the Office Action identified as corresponding to the claimed search device). Thus, Michaels does not disclose or suggest what claim 16 recites.

Indeed, Michaels clearly differentiates between its Stage 1 Memory 70 (which the

Office Action identified as corresponding to the claimed cache) which is shown and described as being part of the search engine, and the Primary Memory 58 which is shown and described as separate.

The Office Action responded to the above distinction (as explained in a response filed June 29, 2006) by stating, at page 6, that Appellants should "refer to the rejection of claims 1, 7, 13, and 16." Appellants respectfully submit that the rejection of claims 1, 7, 13, and 16 is not responsive to Appellants' argument, because the rejection of claims 1, 7, 13, and 16 does not address the clear distinction in Michels between the search engine (shown by box 60 in Figure 3) and the primary memory (shown by box 58 in Figure 3). Like the media interface (shown by box 56 in Figure 3), the network cable (shown by arrow 74 in Figure 3), and the port intercommunication logic (shown as box 54 in Figure 3), the primary memory 58 is clearly not part of box 60, i.e. the search engine of Michels. The Office Action's comment to refer to the rejection, thus, does not address Applicant's arguments presented in the response filed June 29, 2006.

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Accordingly, it is respectfully submitted that Michels fails to disclose all of the elements of any of the presently pending claims, and that the Office Action does not provide a substantial basis for refusing to grant a patent, and thus should be reversed for each of those reasons.

The Advisory Action did not remedy the deficiencies of the Office Action with regard to responding to the distinctions presented above. The Advisory Action, on the continuation sheet, simply asserted that "Michels discloses a search device including two binary search engines (a search engine), stage 1 memory and primary memory." However, as can be clearly seen in Figure 3, the Advisory Action's assertion is factually incorrect. That is not what Michels discloses. Michels discloses a search device (60) including two binary search engines (66 and 68) and a first stage memory (70). Michels' search device (60) additionally includes key extraction logic 64 and forwarding decision logic 72, but does not include primary memory 58. Accordingly, there is no rational basis upon which the rejection can be upheld. Furthermore, the Advisory Action's assertion does not address the arguments provided above: it simply indicates disagreement.

Accordingly, because Michels does not disclose or suggest all of the elements of claim 16, it is respectfully requested that the rejection of claim 16 be reversed.

12. The rejection of claim 17 is in error and should be reversed.

Claim 17 depends from claim 16 and further recites a search stage zero segment configured to search the ARL cache in the first number of search cycles, the search stage zero segment connected to the ARL cache. Claim 17 also recites a search stage one segment configured to search the ARL table in a second number of search cycles based

on search results of the ARL cache, the search stage one segment connected to the search stage zero segment and the ARL table.

Appellants respectfully submit that the arguments regarding claim 16 also apply to claim 17. Accordingly, it is respectfully submitted that claim 17 recites subject matter that is neither disclosed nor suggested by Michels. Thus, it is respectfully requested that the rejection of claim 17 be reversed.

13. The rejection of claim 19 is in error and should be reversed.

Claim 19 depends from claim 16 and further recites that the first number of search cycles is equal to the second number of search cycles.

Appellants respectfully submit that the arguments regarding claim 16 also apply to claim 19. Accordingly, it is respectfully submitted that claim 19 recites subject matter that is neither disclosed nor suggested by Michels. Thus, it is respectfully requested that the rejection of claim 19 be reversed.

14. The rejection of claim 21 is in error and should be reversed.

Claim 21 depends from claim 17 (which, in turn, depends from claim 16) and further recites that the first number of search cycles is equal to the second number of search cycles.

Appellants respectfully submit that the arguments regarding claims 16 and 17 also apply to claim 21. Accordingly, it is respectfully submitted that claim 21 recites subject matter that is neither disclosed nor suggested by Michels. Thus, it is respectfully requested that the rejection of claim 21 be reversed.

B. The rejection of claims 3, 5, 9, 11, 14, 18, and 20 under 35 U.S.C. 103(a) as being unpatentable over Michels alone is in error and should be reversed.

In rejecting claims under 35 U.S.C. § 103(a), the USPTO bears the initial burden of establishing a *prima facie* case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). *See also In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The USPTO can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally available to one of ordinary skill in the art suggests the claimed subject matter. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to Appellant. *Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444. *See also Piasecki*, 745 F.2d at 1472, 223 USPQ at 788. In the present appeal, the initial burden is not met, because a *prima facie* case of obviousness has not been established.

The Office Action took the position that Michaels does not teach that the first number of search cycles used to search the cache is less than the second number of search cycles used to search the table. The Office Action asserted that it would have been obvious to modify the number of iterations to search a lookup table so that it will take less time for the binary search engine to search a lookup table with 256 entries than searching a lookup table with 64000 entries. Appellants respectfully submit that this rejection is in error and should be reversed.

With regard to the relative number of search iterations, Michels clearly states that

"one aspect of the invention is that the binary search engines divide the binary search of the lookup table by each performing some of the iterations of the overall search. For example, if the lookup table has 64K entries, the binary search engine 66 performs the first eight iterations of the search and binary search engine 68 performs the last eight iterations," at column 5, line 66 to column 6, line 5. All the other examples in Michels also clearly show the binary search engines sharing equal number of iterations.

As Michels explains at column 5, lines 63-65, although a 64K table may require 16 iterations, a 256 entry table requires 8 iterations to search. Accordingly, one of ordinary skill in the art, following Michels' teaching would be motivated to search with two binary search engines, each performing four iterations if the table had only 256 entries. Accordingly, Appellants respectfully disagree that there is teaching, motivation, or suggestion to modify Michels to provide the recitations identified by the Office Action.

The Office Action responded to the above distinction (as presented in the response filed June 29, 2006) by stating, at page 6, that Appellants should "refer to the rejection of claims 3, 5, 9, 11, 14, 18, and 20." Appellants respectfully submit that the rejection of claims 3, 5, 9, 11, 14, 18, and 20 is not responsive to Appellants' argument, because the rejection of claims 3, 5, 9, 11, 14, 18, and 20 does not address the discussion in Michels of balanced iterations.

As noted above, the MPEP 707.07(f) sets forth the Examiner's obligation to answer all material traversed. Specifically MPEP 707.07(f) states that "the examiner should, if he or she repeats the rejection, take note of the applicant's argument and **answer the substance of it**." (Emphasis added.) The Office Action took note of Appellants' argument, but failed to answer the substance of it. Accordingly, there is not

a substantial basis for upholding the rejection, as Appellants' arguments regarding non-obviousness are unrebutted in the record. It is, therefore, respectfully requested that the rejections of claims 3, 5, 9, 11, 14, 18, and 20 – addressed individually below – be withdrawn.

The Advisory Action did not remedy the deficiencies of the Office Action with regard to responding to the distinctions presented above. The Advisory Action, on the continuation sheet, simply asserted that "Michels clearly suggests that binary search engines can perform any number of iterations depending on the particular application (column 6, lines 22-26)." Appellants agree that Michels states that "binary search engines can perform any number of iterations depending on the particular application," but that quotation taken from column 6, lines 24-26, of Michels does not address what is claimed, or provide teaching, motivation, or suggestion for the modification asserted by the Office Action. Accordingly, there is no rational basis upon which the rejection can be upheld. Furthermore, the Advisory Action's assertion does not address the arguments provided above: it simply indicates disagreement.

1. The rejection of claim 3 is in error and should be reversed.

Claim 3 depends from claim 1 and further recites that the first number of cycles is less than the second number of search cycles. Accordingly, as explained above, the further recitations of claim 3 are not disclosed or suggested by Michels, and would not have been obvious in view of Michels' disclosure. Additionally, the distinctions explained above with regard to claim 1 are also relevant to claim 3. Thus, for each of those reasons, it is respectfully submitted that the rejection of claim 3 should be reversed.

2. The rejection of claim 5 is in error and should be reversed.

Claim 5 depends from claim 2 (which, in turn, depends from claim 1) and further recites that the first number of search cycles is less than the second number of search cycles. Accordingly, as explained above, the further recitations of claim 5 are not disclosed or suggested by Michels, and would not have been obvious in view of Michels' disclosure. Additionally, the distinctions explained above with regard to claims 1 and 2 are also relevant to claim 5. Thus, for each of those reasons, it is respectfully submitted that the rejection of claim 5 should be reversed.

3. The rejection of claim 9 is in error and should be reversed.

Claim 9 depends from claim 7 and further recites that the first number of search cycles is less than the second number of search cycles. Accordingly, as explained above, the further recitations of claim 9 are not disclosed or suggested by Michels, and would not have been obvious in view of Michels' disclosure. Additionally, the distinctions explained above with regard to claim 7 are also relevant to claim 9. Thus, for each of those reasons, it is respectfully submitted that the rejection of claim 9 should be reversed.

4. The rejection of claim 11 is in error and should be reversed.

Claim 11 depends from claim 8 (which, in turn, depends from claim 7) and further recites that the first number of search cycles is less than the second number of search cycles. Accordingly, as explained above, the further recitations of claim 11 are not disclosed or suggested by Michels, and would not have been obvious in view of Michels'

disclosure. Additionally, the distinctions explained above with regard to claims 7 and 8 are also relevant to claim 11. Thus, for each of those reasons, it is respectfully submitted that the rejection of claim 11 should be reversed.

5. The rejection of claim 14 is in error and should be reversed.

Claim 14 depends from claim 13 and further recites that the first number of search cycles used to search the cache is less than the second number of search cycles used to search the table. Accordingly, as explained above, the further recitations of claim 14 are not disclosed or suggested by Michels, and would not have been obvious in view of Michels' disclosure. Additionally, the distinctions explained above with regard to claim 13 are also relevant to claim 14. Thus, for each of those reasons, it is respectfully submitted that the rejection of claim 14 should be reversed.

6. The rejection of claim 18 is in error and should be reversed.

Claim 18 depends from claim 16 and further recites that the first number of search cycles is less than the second number of search cycles. Accordingly, as explained above, the further recitations of claim 18 are not disclosed or suggested by Michels, and would not have been obvious in view of Michels' disclosure. Additionally, the distinctions explained above with regard to claim 16 are also relevant to claim 18. Thus, for each of those reasons, it is respectfully submitted that the rejection of claim 18 should be reversed.

7. The rejection of claim 20 is in error and should be reversed.

Claim 20 depends from claim 17 (which, in turn, depends from claim 16) and further recites that the first number of search cycles is less than the second number of search cycles. Accordingly, as explained above, the further recitations of claim 20 are not disclosed or suggested by Michels, and would not have been obvious in view of Michels' disclosure. Additionally, the distinctions explained above with regard to claim 17 are also relevant to claim 20. Thus, for each of those reasons, it is respectfully submitted that the rejection of claim 20 should be reversed.

C. The rejection of claims 22-25 under 35 U.S.C. 103(a) as being unpatentable over Michels in view of allegedly admitted prior art ("AAPA") is in error and should be reversed.

As noted above, in rejecting claims under 35 U.S.C. § 103(a), the USPTO bears the initial burden of establishing a *prima facie* case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). *See also In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The USPTO can satisfy this burden by showing that some objective teaching in the prior art or knowledge generally available to one of ordinary skill in the art suggests the claimed subject matter. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to Appellant. *Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444. *See also Piasecki*, 745 F.2d at 1472, 223 USPQ at 788. In the present appeal, the initial burden is not met, because a *prima*

facie case of obviousness has not been established.

Appellants respectfully assert that paragraph [0055] on page 16 of the present application (cited by the Office Action) does not contain any admission of prior art. Paragraph [0055] of the present application does not even mention the term "prior art," nor is it found in a "background" section (which would not necessarily imply that it was prior art), but is part of the "Detailed Description of the Preferred Embodiments" beginning on page 5, with paragraph [0011] and concluding on page 16, with paragraph [0056].

Furthermore, paragraph [0055] states "A person ... would be able to implement the various modules ... etc. ... unto a single semiconductor substrate, **based upon the architectural description discussed above**." (Emphasis added.) Accordingly, paragraph [0055] clearly indicates that single semiconductor substrate feature is dependent not on the general knowledge of one of ordinary skill in the art, but upon the disclosure of the present application. Thus, the single semiconductor substrate feature cannot possibly be considered admitted prior art.

The Advisory Action asserts, apparently as an alternative basis, that the "single substrate" feature would have been obvious "as a matter of design choice." Appellants respectfully submit that MPEP 2144.04 (VI)(C) clearly states that "'The mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. The prior art must provide a motivation or reason for the worker in the art, without the benefit of appellant's specification, to make the necessary changes in the reference device.' *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984)".

Neither the Office Action nor the Advisory Action provides such a motivation or reason. Thus, the rejection is clearly erroneous, and should be reversed.

1. The rejection of claim 22 is in error and should be reversed.

Claim 22 depends from claim 1 and further recites that the table and the search engine are embodied on a single substrate. Accordingly, as explained above, the further recitations of claim 22 are not disclosed or suggested by Michels, and would not have been obvious in view of Michels' disclosure. Additionally, the distinctions explained above with regard to claim 1 are also relevant to claim 22. Thus, for each of those reasons, it is respectfully submitted that the rejection of claim 22 should be reversed.

2. The rejection of claim 23 is in error and should be reversed.

Claim 23 depends from claim 7 and further recites that the table means and the search engine means are embodied on a single substrate means. Accordingly, as explained above, the further recitations of claim 23 are not disclosed or suggested by Michels, and would not have been obvious in view of Michels' disclosure. Additionally, the distinctions explained above with regard to claim 7 are also relevant to claim 23. Thus, for each of those reasons, it is respectfully submitted that the rejection of claim 23 should be reversed.

3. The rejection of claim 24 is in error and should be reversed.

Claim 24 depends from claim 1 and further recites embodying the table and the search engine on a single substrate. Accordingly, as explained above, the further

recitations of claim 24 are not disclosed or suggested by Michels, and would not have been obvious in view of Michels' disclosure. Additionally, the distinctions explained above with regard to claim 13 are also relevant to claim 24. Thus, for each of those reasons, it is respectfully submitted that the rejection of claim 24 should be reversed.

4. The rejection of claim 25 is in error and should be reversed.

Claim 25 depends from claim 16 and further recites embodying the ARL table and the search engine on a single substrate. Accordingly, as explained above, the further recitations of claim 25 are not disclosed or suggested by Michels, and would not have been obvious in view of Michels' disclosure. Additionally, the distinctions explained above with regard to claim 16 are also relevant to claim 25. Thus, for each of those reasons, it is respectfully submitted that the rejection of claim 25 should be reversed.

IX. CONCLUSION

For all of the above noted reasons, it is respectfully submitted that numerous clear differences exist between the present invention as claimed in claims 1-25 and the cited art relied upon by the Examiner. It is further contended that these differences are more than sufficient to establish both novelty and non-obviousness of the present invention, even though, in any case, the burden is on the USPTO to provide a *prima facie* case for anticipation and obviousness, which has not be done.

This final rejection being in error, therefore, it is respectfully requested that this honorable Board of Patent Appeals and Interferences reverse the Examiner's decision in this case and indicate the allowability of application claims 1-25.

In the event that this paper is not being timely filed, Appellants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees which may be due with respect to this paper may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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Encls: Appendix 1 – Claims; Appendix 2 – Evidence; Appendix 3 - Related Proceedings

APPENDIX 1

CLAIMS APPENDIX

1. (Original) A table search device comprising:

a table having a plurality of entries;

a cache having a subset of entries of said plurality of entries of said table; and

a search engine configured to search said cache in a first number of search cycles and then search said table in a second number of search cycles based on search results of said cache, said search engine connected to said table and said cache.

2. (Original) The device as recited in claim 1 wherein said search engine comprises:

a search stage zero segment configured to search said cache in said first number of search cycles, said search stage zero segment connected to said cache; and

a search stage one segment configured to search said table in a second number of search cycles based on search results of said cache, said search stage one segment connected to said search stage zero segment and said table.

3. (Original) The device as recited in claim 1 wherein:

said first number of cycles is less than said second number of search cycles.

4. (Original) The device as recited in claim 1 wherein:

said first number of search cycles is equal to said second number of search cycles.

5. (Original) The device as recited in claim 2 wherein:

said first number of search cycles is less than said second number of search cycles.

6. (Original) The device as recited in claim 2 wherein:

said first number of search cycles is equal to said second number of search cycles.

7. (Original) A table search system comprising:

a table means for storing a plurality of entries;

a cache means for storing a subset of entries of said plurality of entries of said table means; and

a search engine means for initially searching said cache means in a first number of search cycles and then searching said table means in a second number of search cycles based on search results of said cache means.

8. (Original) The system as recited in claim 7 wherein said search engine means comprises:

a search stage zero segment means for searching said cache means in said first number of search cycles, said search stage zero segment means being connected to said cache means; and

a search stage one segment means for searching said table means in said second

number of search cycles based on search results of said cache means, said search stage one segment means being connected to said table and said search stage zero means.

9. (Original) The system as recited in claim 7 wherein:

said first number of search cycles is less than said second number of search cycles.

10. (Original) The system as recited in claim 7 wherein:

said first number of search cycles is equal to said second number of search cycles.

11. (Original) The system as recited in claim 8 wherein:

said first number of search cycles is less than said second number of search cycles.

12. (Original) The system as recited in claim 8 wherein:

said first number of search cycles is equal to said second number of search cycles.

13. (Previously Presented) A method for performing a table lookup, the method comprising:

creating a table having a plurality of entries in a search device;

creating a cache, in the search device, having a subset of entries of said plurality of entries of said table;

searching, by a search engine in the search device, said cache in a first number

of search cycles; and

searching, by the search engine, said table in a second number of search cycles based on search results of said cache.

14. (Original) The method as recited in claim 13 wherein:

said first number of search cycles used to search said cache is less than said second number of search cycles used to search said table.

15. (Original) The method as recited in claim 13 wherein:

said first number of search cycles used to search said cache is equal to said second number of search cycles used to search said table.

16. (Previously Presented) A network switch comprising:

an ARL table having a plurality of entries;

an ARL cache having a subset of entries of said plurality of entries of said ARL table; and

a search engine configured to first search said ARL cache in a first number of search cycles and then search said ARL table in a second number of search cycles based on search results of said ARL cache, said search engine connected to said ARL table and said ARL cache,

wherein a search device comprises the search engine and the ARL table.

17. (Original) The network switch as recited in claim 16 wherein said search

engine comprises:

a search stage zero segment configured to search said ARL cache in said first number of search cycles, said search stage zero segment connected to said ARL cache; and

a search stage one segment configured to search said ARL table in a second number of search cycles based on search results of said ARL cache, said search stage one segment connected to said search stage zero segment and said ARL table.

18. (Original) The network switch as recited in claim 16 wherein:

said first number of search cycles is less than said second number of search cycles.

19. (Previously Presented) The network switch as recited in claim 16 wherein:

said first number of search cycles is equal to said second number of search cycles.

20. (Original) The network switch as recited in claim 17 wherein:

said first number of search cycles is less than said second number of search cycles.

21. (Original) The network switch as recited in claim 17 wherein:

said first number of search cycles is equal to said second number of search cycles.

22. (Previously Presented) The table search device of claim 1, wherein the table

and the search engine are embodied on a single substrate.

23. (Previously Presented) The table search system of claim 7, wherein the table means and the search engine means are embodied on a single substrate means.

24. (Previously Presented) The method of claim 13, further comprising:

embodying the table and the search engine on a single substrate.

25. (Previously Presented) The method of claim 16, further comprising:

embodying the ARL table and the search engine on a single substrate.

APPENDIX 2

EVIDENCE APPENDIX

No evidence under section 37 C.F.R. 1.130, 1.131, or 1.132 has been entered or will be relied upon by Appellants in this appeal.

APPENDIX 3

RELATED PROCEEDINGS APPENDIX

No decisions of the Board or of any court have been identified under 37 C.F.R. §41.37(c)(1)(ii).